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ABSTRACT

This paper outlines experiences at the University of Queensland Library (UQL) in meeting the challenge of creating an appropriate library and information service to support effective learning. The changing customer base and the changing environments of higher education and libraries are described. Four strategies for extending the role of the Library in active support of teaching and learning at the University of Queensland are then described. These include: thoughtful and innovative design, maintenance and use of effective virtual and physical facilities; development of Web-based interactive information skills programs; creation of the University of Queensland Cybrary; and building positive educational experiences for high school students through the University of Queensland Library Cyberschool. (AEF)

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LEADING LIFE-LONG LEARNING: THE LIBRARY'S ROLE

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Overview

Libraries operate within the service industry and increasingly are seeing marketing as a focus for ensuring that the services they provide are useful and appropriate. In a marketing context, users become customers; the services provided are products developed to meet customer needs; a price is involved in an exchange process (although it may not have a monetary value); the place in or from which the services are provided is part of the process; and promotional strategies are used to ensure services provided are understood and valued by the customers. To take on an effective role in the support of learning, libraries need to understand their customers, the learners. They need to know how people learn and how the provision of information and information resources contributes to learning. Customer needs must then be translated into services through a thorough understanding of the changing socio-cultural, economic and educational environment. Some of the experiences at the University of Queensland Library in meeting the challenge of creating an appropriate library and information service to support effective learning are outlined in this paper. The changing customer base and the changing higher education and library environments are described and four service strategies developed are referred to. These are the design of new facilities, the introduction of interactive information skills programs, the development of the University of Queensland Cybrary and a schools project.

Who are our customers?

In the Australian context, eighteen to twenty two year old high school graduates from middle class families no longer dominate today's undergraduate student body. There are increasing numbers of adults from diverse backgrounds, already in the workplace, many with families, many with very little formal education and many from different countries and cultures. These changes in the undergraduate and postgraduate student population are expected to continue as work environments continue to change rapidly. School-leavers now comprise just under 50% of the student population. The new generation of students exercises choice in selecting the higher education institution in which to enroll, is more focussed in choosing which course or combination of courses to study, and opts for a variety of study modes - part-time, full-time, distance mode, weekend mode or a mixture of modes. Many prefer flexible learning modes which do not require a physical presence on campus (1). Lifelong learning is the aim of many. Some are entering new careers. Others are seeking stimulation in what is an early retirement. Younger students too have varying aspirations for their studies at University and different approaches to learning

Understanding the changing customer base

Three years ago, the University of Queensland Library engaged a market research firm to explore the attitudes of students towards the Library as part of their attitudes towards various services provided by the University (2). Focus group discussions were held and the results showed that students regard themselves as important and deserving. They are self-centred and see University education as a right. In Australia, tertiary education is "free" although students pay HECS (Higher Education Contribution Scheme) which varies in cost according to the disciplinary program studied. Students may pay HECS up-front at a discounted rate or at the end of their studies when it is deducted from their wages once a certain minimum

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annual salary is earned. The HECS leads students to believe that they are paying for their education, even though this constitutes a minor part of the costs involved. The students believe themselves to be poor (although much of the socio-economic data of the student population would deny this) and are passive in their approach to the University, unlike their activist colleagues of some years ago. Nevertheless, there is an underlying anger beneath this passivity.

The study showed that the student view of all services at the University is coloured by the student emphasis on academic progress. They relate primarily to the teaching departments or faculties and not to the services provided by others. They have little understanding of the varying types of University services available and do not really wish to gain detailed knowledge of them. There are (not unexpectedly) marked differences between male and female students. The females are more focussed on the end result and are good at finding help. Males tend to be more idealistic and see the need to seek help as a sign of weakness. The results further showed that the students are from a "now" generation. They regard the University as a wealthy "special place" of excellence. Most students appeared to be unconcerned about passing or failing, but wish to fine-tune their results to attain a higher level pass which will reap the final reward of an interesting well paid job. While at University, they want to gain a general understanding of life and training in how to think as well as some specific area of knowledge or expertise. Inherent in their expectations is that the University will somehow make it all come out right for the student. The Library is perceived as the only essential service (outside of the teaching) at the University because of its direct link to academic progress.

The student perspective on the Library

The market research focussed on the Library as well as the general view of the University as a whole. Students see the Library as a University icon. They see it is a strong contributor to the University of Queensland image. They see the Library as a symbol of the old-fashioned heritage values of University life. On the whole, students are satisfied with Library services. They see the Library as a haven within an alien world. They consider the training courses provided to be excellent and the problems they perceived relate to communication about new services and the availability of up-to-date materials. They understand the period of change in which the Library is involved and see the Library as central to help in use of information technology and improving their own learning skills. While most of the findings were expected, not all Library planning at that stage had focussed on the needs revealed and the information has proved invaluable in determining the future of information service delivery to students at the University.

In 1997, The University of Queensland Library engaged a market research consultant to conduct further focus groups with library users to assist on this occasion in the development of an ideal approach to the restructuring of its web pages (3). The incremental growth of the home page and its associated content had led to an array of ill-assorted data. The web site had been designed from the library perspective rather than a client's and was internally, rather than externally defined. The focus group findings were again invaluable in determining future directions. Specifically, the focus group research was intended to:

- determine the existing client needs in relation to the library web site
- obtain client reaction to the model under construction
- explore a number of existing library web pages to determine patterns of usage and reaction to layout.

The results of the research revealed that most people know only a little about the Library, and that few will ever acquire an in-depth knowledge. Their approaches to the Library web site are task-oriented and frequently crisis-driven. Many users lack computer skills, Internet skills and information seeking skills. For these clients, the Library is a source of frustration. Most students approach the Library in search of reference material for assignments, theses and papers. Hence, their primary need is direct access to the catalogue and database network. Whether experienced or inexperienced, they are interested in learning how to search more effectively. They need details about the Library including the hours of operation,

borrowing rules, the location of library branches and facilities available in each branch. Undergraduate students particularly are interested in access to examination papers.

The market research also found that the student's level of experience and degree of confidence impact on the ability of people to explore a web site. Experienced users are more likely than inexperienced ones to use search engines. Experienced users agreed a good web site is one that is updated regularly. In summary, students want speed of access, instant comprehension of link words for efficient browsing, the ability to navigate/explore the site, help with searching, information on University courses and what they regard as essential information on the Library.

The changing higher education environment

The 1990s have presented many challenges for universities in terms of increased costs, ever-changing information technology that continues to become more sophisticated, a changing student population, new pedagogic directions and a new role for the university in lifelong learning. Universities in dealing with these changes have reviewed their operations, revised their activities and reinvented themselves, creating new opportunities.

Globalisation is a trend throughout society and universities too have become globalised. The move towards a knowledge-based society in a rapidly changing education market place is driving universities to prepare their students for lives and careers in the Information Age (4). Professional organisations and employees have been voicing for some time their concerns about the types and levels of skills and knowledge required by graduates. They have used their mandate to influence the university curriculum by way of accreditation and employment of graduates and funding for universities. Numerous reports on graduate outcomes emphasise the importance of critical thinking, problem solving and effective communication skills.

The 1996 review of engineering education in Australia "Changing the Culture: Engineering Education into the Future" (5) in discussing the changing focus of engineering education, states that:

> *"The focus of engineering education will be on creating lifelong learners, from early education, through undergraduate education to continuing professional education, and from generalist to technical specialist." "Engineering courses must have clearly stated goals and outcomes and equip graduates for lifelong learning".*

Emphasis on lifelong learning is not confined only to engineering education. Companies like Motorola, Boeing, British Aerospace and professional organisations for accountants, management and others have already begun establishing their own universities or partnering with existing universities to provide in-house degrees to their employees or members. In this context, educational programs are carefully tailored to meet the specific lifelong learning needs of particular groups of students. It appears that traditional universities have failed to produce satisfactory outcomes for some.

The new pedagogic paradigm emphasises the empowerment of students and encourages them to take control of their own learning. The student becomes a learner, the teacher becomes a coach; the teacher-centered university becomes a learner-centered educational environment; teaching is transformed into the design and management of learning experiences (6). The sage on the stage has become the guide on the side. This new learning environment for students has a significant impact on academic libraries. The library can play a central role in the transformation of the learning environment.

The changing Library environment

In transforming the learning environment, one goal of the library in the Information Age is to foster effective self-service among users and to create lifelong and self-directed learners(7). The Library is focussing on the creation of self-sufficient information literate customers. Just as the shift in education is

moving from "just in case" education to "just in time" or "just for you" education, libraries must reorganise themselves for "just in time" and "just for you" service to their customers. Librarians must also reinvent themselves and become involved actively in teaching how to find, use and evaluate information as part of a lifelong learning continuum. Principles of information/knowledge management and the ability to access and exploit a variety of information resources to increase productivity are added values libraries provide to their customers.

The value libraries add to the life learning process must be demonstrated along with the competitive edge they provide to their parent organisations in terms of competition for more/better students. The difference the library makes to increase the impact of the brand their parent organisation is marketing needs to be articulated and communicated in a language that is clearly understood by the governing bodies.

The capacity of libraries to "make the difference" to the learning experience has on the one hand never been greater but on the other never been more constrained. The opportunities provided by new technologies are limitless but the high cost of providing library collections, including full-text electronic resources as well as print resources, which both escalate in price at a rate faster than consumer price indices; the cost and complexity of an appropriate information technology infrastructure; in the Australian context a low valuation of the dollar against other currencies; and the difficulty of obtaining funds to cope with the increased costs are integral, inescapable and limiting features of the changing environment for libraries.

The Library's response

What are the appropriate responses? The possibilities range from greater involvement of libraries in the planning, design and delivery of the curriculum for flexible learning, offering information skills training at a time and place and in a format that suits the customers, different types of physical space and facilities in the library for individuals and groups, highly personalised virtual services on the Web and easy to use, new access tools to exploit the new services and collections both on the Web and in the Library. These changes obviously have significant consequences on strategic and financial planning, facilities design, and the recruitment, training and deployment of staff.

How do we plan and provide *just in time* and *just for you* information service to large numbers of users who may live thousands of kilometers away or in the same city, but prefer to take courses in flexible delivery mode due to work, family or other commitments? A study on users' expectations at Duke University has re-enforced the findings of our own focus group work. High touch and high tech go hand in hand. The majority of users think a good information source is one that includes a librarian. Campbell (8) argues that "We must convincingly humanise the technological library". The challenge of including librarians in an increasingly dehumanised environment will involve a fresh and radical examination of our services, staff and operations as a whole.

Many libraries have already adopted numerous strategies in reinventing themselves. They are using benchmarking, TQM (Total Quality Management) and performance measurement approaches to improve service delivery. They are adopting flatter organisational structures with fewer layers of hierarchy to seek faster and more responsive action to deal with the customisation and personalisation that the new complex marketplace demands. They are using improved communication and promotional strategies to reach their customers.

Librarians are finding new ways of working with academics to ensure students learn how to learn. Libraries are forming partnerships with teaching staff, instructional designers and IT experts. Such partnerships may extend beyond the university, leading to collaboration with commercial organisations seeking continuing education for their employees, with schools wanting to introduce advanced skills and knowledge at an early stage and government organisations.

The University of Queensland Library

The University of Queensland Library is the largest library in Queensland. It contains 1.8 million volumes, 11,000 videos, 20,000 journal titles, 3000 electronic journals and extensive microform, multimedia, digital and primary source collections. Stretched end-to-end the collections would reach from Brisbane to the Gold Coast. Bigger does not necessarily mean better for students and the Library's very size can be confusing- finding one's way through the many resources to the few that are needed for a particular purpose has never been easy. The Library provides its services to students and to their teachers through thirteen branch libraries located at several campuses, St Lucia (in Brisbane, the capital of Queensland), Ipswich (a 30 minute drive from Brisbane) and Gatton (a one hour drive from Brisbane) campuses and in several teaching hospitals (located primarily in Brisbane) and in the Dental School (Brisbane CBD). Over 200 databases are networked and dial-up access is available to most of them.

The Library has designed its physical facilities around student needs. Surveys of students are regularly undertaken to ensure feedback and to assist in planning and design of services provided. Services to assist students range from one-on-one inquiry services to Internet training in classroom situations. The collections are housed in branch libraries, based on discipline and geography and in a warehouse on the St Lucia campus which provides cost-effective storage for less used material. Each branch library includes similar facilities and provides similar services, although there are some variations due to client need. While the services are designed for the benefit of students and staff of the University, these same services are appreciated by members of the wider community who regularly use the Library.

Many strategies have been used to extend the role of the Library in active support of teaching and learning at the University of Queensland. Four strategies are now described;

- facilities design
- interactive information skills programs
- *University of Queensland Cybrary*
- schools projects

Facilities design

Classical library design has focused on the physical collection, with careful calculations about current size and projected expansion. The Library has been seen as a "place" where materials are stored, readers are seated, and staff work, many behind the scenes processing materials. Service areas have also been provided, with circulation or loans desks, and information or reference desks. This approach to library design matched the traditional paradigm of the library. Scholars, or users, went to a physical place to gain access to recorded knowledge. They used bibliographic records and rows of shelves of printed materials. Librarians were guardians of their collections and assisted users find their way.

The traditional paradigm of the Library has gone but traditional approaches to library design have continued, with few changes in the appearance of libraries. Many still suffer from the "edifice" complex, are difficult to use, and lack functionality. New approaches to library design must focus on the client, accommodate the technology, provide for training of clients in information skills, be cost-effective, allow for printed collections which while shrinking in their expansion rates are still growing, accommodate staff whose primary activity is service to users, and support the social role the Library has always played. Thoughtful and innovative creation, maintenance and use, including the packaging, promotion and advertising, of effective virtual and physical facilities will do much to meet the customer needs already identified.

The University of Queensland Library undertook a major refurbishment project in 1997/98 to upgrade its Social Sciences and Humanities Library (which included an outmoded an undergraduate library). This is

the largest branch on the St Lucia campus and serves 50% of the student population. The customer was the focus of the design. Initial ideas were developed and trialled in an upgrade of the Dorothy Hill Physical Sciences and Engineering Library. The physical layout and facilities of many service organisations, such as telephone sales, banks, airlines and shops were examined for inspiration and ideas. The refurbishment involved not just more computers, but computers in a range of different kinds of spaces, express workstations for quick look-up, email, self check-out machines, special study spaces for post-graduate students, computer rooms for training students to exploit various electronic resources, large discussion rooms with tables for groups of undergraduate students with access to workstations, photocopiers and networked printers, small discussion rooms for group work and single study rooms.

The signage in both the newly refurbished library and most other branch libraries was reviewed and redesigned with the assistance of the architect and a signage consultant. The colour, shape and the wording of signs were replicated in the print publications as well as design of the Library's home page. All workstations in the Library are equipped with the same kind of software and look the same to ensure that students find the same interface and same resources wherever they go. CJK script was installed on all computers for overseas students to access newspapers and other resources in their native languages.

In summary, the upgrade has provided cost effective services to customers, including academic staff, postgraduate and undergraduate students, and the associated research community; amalgamated formerly separate collections; ensured the most appropriate flow of people and the linking of services in relation to the way information is used; ensured flexibility in space design to accommodate future changes; provided for gateway services, and an Electronic Information Centre of approximately 100 computer workstations for word processing and other applications use as well as Internet use; groups of computers for accessing the electronic library; computer laboratories which can be used as training rooms for information skills programs; a conference room seating 100; an exhibition space; appropriate housing of the traditional printed collections for the foreseeable future, with separate controlled access for specific sub-collections; attractive display areas; a variety of seating including individual carrels, comfortable seating, and group discussion; a social meeting area/coffee shop; suitable provision for dial-up user access; appropriate accommodation and amenities for staff; and appropriate spaces and facilities for the use of postgraduate students and researchers.

Interactive Information Skills Programs

The University of Queensland Library uses a variety of information skills programs. Special programs for postgraduate students have been developed. Standard Internet classes are regularly provided. Lunchtime clinics are held. However, a particularly effective program has been developed for first year engineers. This program has evolved from a print-on-paper-based approach five years ago through an initial Web experiment three years ago to a fully fledged interactive program using WebCT. This program is an example of effective collaboration and partnership with the teaching staff and has provided the opportunity for innovative library services which facilitate flexible learning as well as lifelong learning. The program began as part of an initiative of the Dean of Engineering to revitalise the first year engineering program in response to the outcomes stated in the National Engineering Review discussed previously. The program was designed to use problem-based learning and a project approach to the studying of engineering. The subject is called *Introduction to Professional Engineering* and project topics change every year. In 1998, the topics were:

- Does Brisbane need a superstadium
- Small scale modular cogeneration units
- Business opportunity in biomaterials
- Grappling with garbage
- Energy systems for a remote mining town

The information skills component of the program is designed to assist and support students in the research for their projects. Specifically it seeks to ensure students acquire skills such as task definition, information seeking strategies, location, access, use and evaluation of information.

In 1998, a web-based instructional tool, WebCT was used to create the program which is interactive, has links to information resources available both in the Library and outside, includes a bulletin board, email and online chat facilities and assessment tools. Librarians designed the program for each project with input from the project coordinators. An instructional designer was consulted to make sure learning objectives were compatible with the design. Evaluation results from previous years as well as assistance from a past student were extensively used to further improve the content and design.

The exercises were made available on the Web for the students to enter their answers. All answers were marked automatically. A database of all possible answers was created. Students were able to go back and check their answers. The program is an assessable component of the entire subject. Students were able to do much of the work at home or wherever they had access to the Internet. The exercises on the Web constitute 8% of the overall assessment of the unit of study and the bibliography of the final project report constitutes 5%. The approach has proven to be extremely effective and evaluations from both staff and students have been extremely positive. Work has also begun on adding to the skills and knowledge developed through this program. Special information skills programs are provided for fourth year engineering projects.

University of Queensland Cybrary

The focus group findings on the Library's web pages led to the University of Queensland Cybrary (http://www.library.uq.edu.au/Cybrary.html). In building the Cybrary, the results of the student input were used. Essential items of communication were placed at the first level of the web pages as few students bother to develop an understanding of what is on offer throughout the site. Information categories were made as clear and concise as possible. Statements were designed to be immediately clear to the lowest level of user and details kept as brief as possible but not hopefully at the expense of understanding. Layout was standardised across all pages. Given the access speed required, non-essential graphics were avoided to reduce the time taken in downloading. Through the Cybrary, students begin with a single integrated web interface to all library collections and services, including library opening hours, staff contacts, branch library layouts and details of facilities and training programmes. From here, they can travel to the local catalogue of on-site holdings of books, journals, videos and other resources. They can access all types of electronic resources, or example, Australian Standards online. Occasionally textbooks are available in electronic form, for example Harrison's *Principles of Internal Medicine* or tools such as *Phase Equilibria Diagrams*. Students are able to view their own borrowing records and renew their loans.

To gain further knowledge from the journal literature, students can continue their voyage of discovery by searching over 200 databases indexing thousands of journals. Students can then find the printed journals on the shelves or use electronic versions. Some of these databases are linked to the electronic form of the journal itself, for example *MathSciNet*, IDEAL, IAC, ABI Inform and CSA. The Cybrary provides access to over 3,000 electronic journals. All are listed in the Library's web catalogue under title, and direct links made to them. The Cybrary provides access to course materials including lecture notes, reading lists with links to the catalogue for each book or journal on the list and past examination papers. The Cybrary's effectiveness was recognised last year with the award of an Australian University Institutional Teaching Award for Student Services.

Schools Programs

The need to build positive educational experiences for high school students led the Library to create the University of Queensland Library Cyberschool. Some initial ideas were gained from a presentation at the IATUL conference in Irvine, California, in 1997. The Cyberschool is a web *'place'* where Queensland high

school students can go to do research using state-of-the-art electronic databases and information tools.

The University of Queensland Library began work on the UQL Cyberschool early in 1998 with an initiative conceived in partnership with international database publisher, Information Access Company (IAC). The first step was a trial by three Brisbane schools of IAC's Expanded Academic ASAP database of 1500 indexed and full text journals. The trial was an overwhelming success, and led to the Library and IAC offering discount access to Expanded Academic ASAP to subscribing Queensland high schools from February 1999. The UQL Cyberschool is at http://www.library.uq.edu.au/schools/.

The Virtual School of Engineering (VSE) project is an extension of the Cybershool program which illustrates the involvement of the Library in lifelong learning, even before students come to the university. It comprises a series of engineering problems that offer participating students from high schools the opportunity to develop their research and problem solving skills through collaborative team work as well as self-paced learning. This project involves a web-based program to promote an understanding of the role of engineers in the community by creating an awareness of the important contribution that engineering makes to the standard of living in Australia. Librarians have been involved in creating the web-based projects in collaboration with teachers and engineers and providing information assistance to students in schools in both remote and local locations. The VSE is at http://webct.library.uq.edu.au:8900/SCRIPT/vse/scripts/serve_home.

Conclusion

The changes in higher education and libraries are both threats and opportunities. If libraries understand their external environment and the needs of their customers, they can maximise the effective use of resources, including funds, brand identity, staff, physical space and facilities, the Web, and their collections, both traditional and electronic, and thereby ensure that the contribution made by libraries to teaching and learning is truly effective. Libraries will be relevant, visible and credible in the new educational environment (9). Libraries must seek external sources for partnerships and innovative ideas to obtain and retain a competitive advantage. Libraries must promote, advertise and repackage their services to all their stakeholders, particularly to emerging types of student learners to ensure value to their stakeholders' and customers' needs and requirements. The new learning environment is here to stay, will libraries?

Abbreviations, acronyms and initials

CSA: Cambridge Scientific Abstracts
GMC: Graduate Medical Course
IAC: Information Access Company
IDEAL: Electronic journal collection from Academic Press
ITLO: Information Technology Liaison Officers
UQL: The University of Queensland Library
WebCT: A Web-based instructional tool designed at the University of British Colombia. It is a template with a range of facilities that course designers can use to prepare and present courses. It includes bulletin board, online chat, student web page creation, email, and assessment facilities.

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